

WHAT IS CLAIMED IS:

- 1 1. A method comprising:
2 providing a DC voltage signal;
3 utilizing a first switching circuit (104) to switch said DC voltage signal so as to
4 produce relative to a reference voltage a positive pulse width modulated voltage signal for
5 about one half of a fundamental output period;
- 6 utilizing a second switching circuit (204) to switch said DC voltage signal
7 so as to produce relative to said reference voltage a negative pulse width modulated
8 voltage signal for about one half of said fundamental output period.
- 1 2. The method as described in claim 1 and further comprising:
2 reversing the polarity of said DC voltage signal after switching said DC
3 voltage signal for about one half of said fundamental output period.
- 1 3. The method as described in claim 2 and further comprising utilizing said first
2 switching circuit (104) to reverse the polarity of said DC voltage signal.
- 1 4. The method as described in claim 2 and further comprising utilizing said second
2 switching circuit (204) to reverse the polarity of said DC voltage signal.
- 1 5. The method as described in claim 1 and further comprising:
2 utilizing a two switch network (SW11, SW12) as said first switching circuit;
3 electrically coupling said two switch network in parallel with said DC voltage
4 signal;
5 utilizing a two switch network (SW21, SW22) as said second switching circuit;
6 electrically coupling said two switch network of said second switching circuit in
7 parallel with said DC voltage signal;
- 8 configuring an output (108) between said two switch network of said first
9 switching circuit and said two switch network of said second switching circuit.
- 1 6. An apparatus comprising:
2 an input (108) to receive a DC voltage signal;
3 a first switching circuit (104) configured to modulate said DC voltage signal so as
4 to produce relative to a reference voltage a positive pulse width modulated voltage signal
5 for about one half of a fundamental output period;

6 a second switching circuit (204) configured to modulate said DC voltage
7 signal so as to produce relative to said reference signal a negative pulse width modulated
8 voltage signal for about one half of said fundamental output period.

1 7. The apparatus as described in claim 6 and further comprising a circuit
2 operable to reverse the polarity of said DC voltage signal.

1 8. The apparatus as described in claim 7 wherein said first switching circuit
2 (104) is operable to reverse the polarity of said DC voltage signal.

1 9. The apparatus as described in claim 7 wherein said second switching
2 circuit (204) is operable to reverse the polarity of said DC voltage signal.

1 10. The apparatus as described in claim 6 wherein said first switching circuit
2 comprises a two switch network in parallel with said DC voltage signal and wherein said
3 second switching circuit comprises a two switch network in parallel with said DC voltage
4 signal; and further comprising an output (108) electrically coupled between said two
5 switch network of said first switching circuit and said two switch network of said second
6 switching circuit.

1 11. An apparatus for providing a pulse width modulated voltage signal, said
2 apparatus comprising:

3 an input (107) to receive a DC voltage signal;

4 a first switching circuit (104) electrically coupled to said input so as to be
5 electrically coupled to said DC voltage signal during operation;

6 a second switching circuit (204) electrically coupled to said input so as to be
7 electrically coupled to said DC voltage signal during operation;

8 wherein said first switching circuit (104) is operable to produce a positive pulse
9 width modulated output signal relative to a reference voltage; and

10 wherein said first switching circuit (104) is operable to reverse the polarity
11 of said DC voltage signal applied to a load during operation.

1 12. The apparatus as described in claim 11 wherein said second switching
2 circuit (204) is operable to produce a negative pulse width modulated output signal
3 relative to said reference voltage.

1 13. The apparatus as described in claim 12 wherein said second switching
2 circuit (204) is operable to reverse the polarity of said DC voltage signal.

1 14. The apparatus as described in claim 11 wherein said first switching circuit
2 comprises a first switch and a second switch, said first switch and second switch operable

3 to reverse said polarity of said DC voltage signal when said first switch is placed in a
4 conducting state and said second switch is placed in a non-conducting state.

1 15. The apparatus as described in claim 11 wherein said input is electrically
2 coupled in parallel with said first switching circuit and said second switching circuit.

1 16. A method of providing a pulse width modulated output voltage signal, said
2 method comprising:

3 providing a DC voltage signal;

4 providing a first switching circuit (104) electrically coupled to said DC voltage
5 signal;

6 providing a second switching circuit (204) electrically coupled to said DC voltage
7 signal;

8 operating said first switching circuit (104) to produce a positive pulse width
9 modulated output signal relative to a reference voltage;

10 operating said first switching circuit to reverse the polarity of said positive
11 pulse width modulated output signal once during a fundamental output period.

1 17. The method as described in claim 16 and further comprising:

2 operating said second switching circuit to produce a negative pulse width
3 modulated output signal relative to said reference voltage.

1 18. The method as described in claim 17 and further comprising:

2 operating said second switching circuit (204) to reverse the polarity of said
3 output signal.

1 19. The method as described in claim 16 wherein said first switching circuit
2 (104) comprises a first switch and a second switch, said method further comprising:

3 reversing the polarity of said positive pulse width modulated output signal
4 by maintaining said first switch in a non-conducting state while maintaining said second
5 switch in a conducting state.

1 20. The method as described in claim 16 and further comprising:

2 electrically coupling said DC voltage signal in parallel with said first switching
3 circuit; and

4 electrically coupling said DC voltage signal in parallel with said second
5 switching circuit.

1 21. An apparatus to generate a pulse width modulated voltage signal, said
2 apparatus comprising:
3 a DC voltage source (102);
4 a first switching circuit (104) comprising a first switch and a second switch
5 configured in a series circuit, said first switching circuit electrically coupled in parallel
6 with said DC voltage source;
7 a second switching circuit (204) comprising a third switch and a fourth switch
8 configured in a series circuit, said second switching circuit electrically coupled in parallel
9 with said DC voltage source;
10 an output (108) comprising a first electrical junction coupling said first
11 switch with said second switch and a second electrical junction coupling said third switch
12 with said fourth switch;
13 said second switching circuit (204) operable to maintain said third switch in a
14 conducting state while said fourth switch is maintained in a non-conducting state so as to
15 establish a first polarity of an output signal;
16 said first switching circuit operable to switch said first switch and said second
17 switch at a modulation frequency;
18 said first switching circuit operable to maintain said second switch in a conducting
19 state while maintaining said first switch in a non-conducting state so as to establish a
20 second polarity of said output signal, said second polarity being the reverse polarity of
21 said first polarity; and
22 said second switching circuit operable to switch said third switch and said
23 fourth switch at said modulation frequency.

1 22. The apparatus as described in claim 21 wherein said first switching circuit
2 and said second switching circuit are configured as part of an application specific
3 integrated circuit.

1 23. The apparatus as described in claim 21 wherein said first switching circuit
2 (104) is operable to produce a positive pulse width modulated output signal during about
3 one half cycle of a fundamental output period; and

4 wherein said second switching circuit (204) is operable to produce a
5 negative pulse width modulated output signal during the other half cycle of said
6 fundamental output period.

1 24. The apparatus as described in claim 21 and further comprising a motor
2 electrically coupled to said output.

1 25. The apparatus as described in claim 21 and further comprising a
2 microprocessor electrically coupled to said first switching circuit and to said second
3 switching circuit, said microprocessor operable to control said first switching circuit and
4 said second switching circuit.

1 26. A method of generating a pulse width modulated voltage signal, said
2 method comprising:

3 providing a DC voltage source (102);

4 electrically coupling said DC voltage source in parallel with a first switching
5 circuit (104) comprising a first switch and a second switch configured in a series circuit;

6 electrically coupling said DC voltage source in parallel with a second switching
7 circuit (204) comprising a third switch and a fourth switch configured in a series circuit;

8 establishing an output (108) comprising a first electrical junction coupling said
9 first switch and said second switch and a second electrical junction coupling said third
10 switch and said fourth switch;

11 maintaining said third switch in a conducting state while maintaining said
12 fourth switch in a non-conducting state so as to establish a first polarity of an output
13 signal;

14 switching said first switch and said second switch at a modulation frequency; then
15 maintaining said second switch in a conducting state while maintaining said first
16 switch in a non-conducting state so as to establish a second polarity of said output signal,
17 said second polarity being the reverse polarity of said first polarity;

18 switching said third switch and said fourth switch at said modulation
19 frequency.

1 27. The method as described in claim 26 and further comprising:

2 configuring said first switching circuit and said second switching circuit as
3 part of an application specific integrated circuit.

1 28. The method as described in claim 26 and further comprising:

2 utilizing said first switching circuit to produce a positive pulse width modulated
3 output signal during about one half cycle of a fundamental output period; and

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4 utilizing said second switching circuit to produce a negative pulse width
5 modulated output signal during the other half cycle of said fundamental output period.

1 29. The method as described in claim 26 and further comprising powering a
2 motor with said output signal.

1 30. The method as described in claim 26 and further comprising controlling
2 said first switching circuit and said second switching circuit with a processor.

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